CEDARVILLE UNIVERSITY

The Idea of an Essay

Volume 1 *Reflecting on Rockwell, Contending for Cursive, and 22 Other Compositions*

Article 24

September 2014

Oil Supply: The Truth

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"Oil Supply: The Truth," by Michael Kuhn

Instructor's Note

In this research-based, argument essay, Michael Kuhn joins in the contemporary conversation about the oil supply and contradicts the common perception that the oil supply will not last much longer. In the requirements of this essay, students had to write an argument-based essay utilizing scholarly resources for support. Michael included quality evidence, grounds, and warrants to support his claim while addressing potential counterarguments. Notice that Michael establishes a context for his research so that he joins in the "conversation" rather than merely listing evidence to support his own ideas. How might his essay be different if he had chosen an organizational pattern other than refutation? How does he maintain a credible and humble ethos despite the fact that he chooses to refute a common perception?

Writer's Biography

Michael Kuhn is a freshman Mechanical Engineering major from West Virginia. Although he does not consider it his calling, he enjoys writing and also dabbles in poetry. When homework and studying are not occupying his time, he fills it with intramural sports, Calculus tutoring, refereeing soccer, working on the Supermileage team, hanging out with friends, playing FIFA '13, and maybe catching up on sleep.

Oil Supply: the Truth

It has helped cause wars. It has dominated national debates and international negotiations. It has dramatically changed certain countries' incomes and wealth. It has been deposited beneath the earth's surface for a considerable time, and it has been integral to worldwide transportation for almost a century. No one disputes these facts about crude oil. There is another "fact" that many would add to this list about oil: it is not going to last much longer.

However, despite how broadly this statement is accepted, this view is quite shy of being a fact and is surrounded by a large degree of dispute and disagreement. The true state of the world's oil supply is much less dire than many claim. Contrary to the overwhelming tide of naysayers, theory supporting oil's decline is oversimplified and inaccurate, the remaining oil supply is actually larger than most estimates, and new discoveries and extraction technologies hold immense potential.

Most of these naysayers, those who argue that oil is nearing global exhaustion, are believers in the theory known as "peak oil." The premise of peak oil is the assumption that the extraction of crude oil in a large theater, such as a country, a continent, or the world, adheres to a distribution based on the graph of an almost symmetrical logistic curve, referred to as "Hubbert's curve" (Mills 36-37). Accordingly, after oil production reaches a maximum, production should decline in a similar, almost identical manner that it originally rose (Ngô and Natowitz 31-32).Within the theory, this forecasted decline underwrites the direness of the current oil situation and also attributes importance to the oil's peak because the peak is seen as the initiation of the decline. M. King Hubbert, a geophysicist with a professional background working for Shell Oil, essentially formulated this theory by his claims made in the 1950s (Nersesian 200). In 1956, Hubbert predicted that U.S. oil production would peak in the early 1970s, and U.S. oil did peak in the early 1970s (200). Although the exact timing of Hubbert's prediction was slightly off, the fulfillment of his prediction served to confirm his theory and gave it immense credibility, and American and international petroleum culture soon accepted peak oil (Black 215).

However, a closer, more investigative view of Hubbert's peak oil theory reveals numerous shortcomings. Hubbert initially projected 1965 as his primary date for the peak of U.S. production; 1970 was actually just a fallback date (Mills 42). With his prediction of 1970, Hubbert was accurate regarding the timing of the U.S. oil production peak, but the amount of production at the peak was 1.12 billion barrels of oil higher than—18 percent above—his

prediction of 3 billion barrels (Smil 63). Despite these inconsistencies, Hubbert's prediction regarding U.S. production is still his most accurate. When applied to, for instance, the oil production of the United Kingdom, Hubbert's curve strikes a dramatic visual contrast with the actual curve of oil production (Mills 40). Hubbert's curve also fails to correlate with the oil production in Iraq, the country with the third-most proven oil reserves in the world (41). Vaclav Smil, Distinguished Professor of Environment and Environmental Geography at the University of Manitoba in Winnipeg, remarks, "Hubbert's failures have been even more glaring as far as the forecast of global peak oil extraction is concerned" (64). In 1969, Hubbert asserted that world oil production would either peak in 1990 at 25 billion barrels or in 2000 at 37 billion barrels (64). By 2008, though, production was just below 30 billion barrels, proving both predictions wrong on stated quantity and timing (64). Even if Hubbert was correct about the U.S. production, the apparent disparity between peak oil and reality serves as ample evidence to invalidate the theory entirely.

Despite the failures of peak oil, many scholars, scientists, and journalists still apply it to the modern oil scene and claim that the economics of the oil market, specifically the law of supply and demand, support the fact that the world's oil is "running out fast" (Connor). Peak-oilers and non-peak-oilers universally agree that demand for oil is increasing worldwide, which drives up its price. However, peak oil enthusiasts also maintain that the raised prices indicate that the worldwide supply is becoming scarcer (Black 217). Journalist Richard Heinberg goes as far as to say that peak oil occurred on a worldwide basis in 2008. He reinforces this allegation by explaining that "during the period from 2005 to 2008, as oil's price steadily rose, production remained stagnant" (113). He continues, saying that production rates slowly increased while the prices remained high, "but then both prices and production fell as demand for oil collapsed" (113). Implications of this situation, from the peak oil perspective, are that the collapse of prices will discourage oil companies

from producing more, and oil production will never recover to its previous levels, effectively having passed its peak.

However, the peak oil perspective presents a limited description of the scenario, grossly oversimplifying the oil market. Smil asserts that lower demand, due to the economic recession of the time, "and not any imminent physical shortage of oil in the ground, was the main reason . . . that global oil production was essentially flat in 2007 . . . and 2008" (72). Smil expresses that, in order for peak-oilers to make their claims, they overlook multiple facets contributing to the oil industry's economic behavior. M. A. Adelman, professor emeritus of economics at the Massachusetts Institute of Technology, additionally comments that if the international oil market included multiple suppliers in close competition, higher prices would indicate that supply is shrinking; however, the world oil market is dominated by the monopoly supplier OPEC, so "the higher prices in themselves mean nothing." The "OPEC" that Adelman refers to is the Organization of Petroleum Exporting Countries. This international organization was founded in 1960, and its original members consisted of Saudi Arabia, Iran, Iraq, Kuwait, and Venezuela (Nersesian 145). Although OPEC did not begin with the intention to raise oil prices, its current goal is to limit production among its members so that oil prices and profits remain high (145). Accordingly, OPEC members, including most of the countries with the largest oil reserves in the world, produce solely within the mandated OPEC quotas, which frequently means deliberately producing less. Therefore, Adelman's argument states that because OPEC countries do not produce as much as they could, the true world supply does not influence the global market scenario, but a manipulated, diminished supply does instead. This diminished supply does not signify the diminishment of the world's oil but rather represents OPEC's faulty and devious character.

In addition to an economic argument, peak-oilers point to statistics on the word's oil supply as evidence that oil decline is imminent. However, these numbers are not necessarily concrete or correct, due to uncertainties and biases. Current oil estimations are based on "proved" or

"proven" reserves, which essentially describe the oil that has been discovered but has not yet been extracted (Adelman). Sometimes national governments conduct estimations for their own reserves, which can produce two outcomes that stray from truth. A nation desiring to seem more influential in the world, such as the United Arab Emirates or Kuwait, may overestimate their proven reserves for their own appearance (Mills 107). More ethical countries like the U.S., desiring to be truthful in their predictions, gain their figures from drilling companies while employing a regulatory body. However, these regulatory administrations tend to use an excessively strict definition for which reserves are actually proven, and they end up producing a conservative number for their estimate (50).

These variations and uncertainties in nations' estimates translate into variations and uncertainties in worldwide oil surveys, as such surveys are typically based on the sum of the figures put out by oil-producing nations. Companies, organizations, and individuals who compute estimates for the world's total reserves also subtract or add certain amounts from countries' stated totals, in order to make the final number more accurate. However, these modifications can often be more theoretical and subjective than they are scientific and objective. This produces a substantial measure of variance among computed world totals. For example, the 2007 BP Statistical Review of World Energy, the study most cited across the board, states the world's proven reserves total as 1208 billion barrels (Mills 52). A more conservative, skeptical 2006 study by geologist Colin Campbell reports the number as low as 791 billion barrels (52). Nevertheless, a 2007 study by Petroleum Intelligence Weekly, based on the most comprehensive international database, sums the world's proven reserves at the much higher number of 1459 billion barrels (52-53). Many times, when peak-oilers claim that the numbers indicate a trend of lack in oil, they are referencing their own numbers based upon their own suspicions, and not those founded upon current, accurate data.

The real debate, though, centers on ultimate reserves, which combine the ideas of proven reserves and "probable" or "likely" reserves. Estimating the world's probable reserves in order to define the ultimate world supply involves a fair amount of predictive capacity, and these predictions vary depending on the source. For instance, to predict the ultimate capacity on the smaller scale of a country, one would have to consider at the current production rate of that country, the size of its oil wells in use, the predicted size of discovered but unused wells, the potential of wells yet-to-be-discovered, and the possible advancement of technology to increase recovery efficiency, and then combine all of these factors to produce a single figure (Adelman). As is the case with proven reserves, probable reserves fluctuate depending on the source. Campbell, in a survey published in 2006, places the world's ultimate reserves at 2152 billion barrels; Shell, from 2003, puts it at 3250 billion barrels; Petroleum Intelligence Weekly, from 2007, labels it at 3903 billion barrels; USGS, from 2006, defines it at 4734 billion barrels; and Odell, from 2004, states it as 6030 billion barrels (Mills 101). The significant variance between these numbers indicates the characteristic unreliability of predicting ultimate reserves. Not only is this unreliability typical, though, it is also inherent, arising from the nature of the prediction. M. A. Adelman describes the predicament as follows: "To predict ultimate reserves, we need an accurate prediction of future science and technology. To know ultimate reserves, we must first have ultimate knowledge. Nobody knows this, and nobody should pretend to know." Due to ultimate reserves' intrinsic conjectural quality, such figures do not hold well in a debate and are too uncertain and faulty to function as a premise of an argument, even though followers of peak oil often employ this strategy.

Despite the uncertainty of oil statistics, there remains an answer to whether there is more oil or less oil. This answer is dependent upon two variables: which proven reserves estimates are more correct and whether oil exploration can actually aid the present state of the oil industry. With regard to global proven reserves estimates,

subjective slant and bias can influence toward a more conservative estimate or toward a more liberal estimate. However, the studies with the greatest scientific, empirical emphasis consistently produce more liberal estimates, indicating that the state of the oil supply is truly not as dismal as many proclaim (Mills 52-53). With regard to the possible impact of oil exploration, two phenomena reinforce the case that discovery will continue to add ample reserves to what is considered proven—lack of exploration and recent advancements in unconventional oil. This lack of exploration occurs mostly within Middle Eastern countries. In many of these countries, especially those which are OPEC members, motivation to find and drill new sites is mostly absent. Comfortably sitting on the largest oil wells known to man, emphasis does not fall on oil discovery. One example is Iraq. Oil industry professional Robin Mills calls Iraq "by far the least developed and explored country for petroleum in the world relative to its potential" (120). There are numerous areas within the country having considerable potential to become substantive oil sources, and upgrading the drilling technology used there could improve output as well (120-121). Mills also states that Iran has "a huge backlog of undeveloped or underdeveloped discoveries," and that the United Arab Emirates' main oil-producing Emirate, Abu Dhabi, "performs hardly any exploration" (119, 122). If oil companies explored these areas sufficiently, new discoveries would significantly add to their already significant reserves, adding also to the global total.

Much more so than acknowledging a lack of exploration in known oil hotspots, discovery and technological advancement are vital to the hope and future of oil. Conversely, if discovery discontinues and efficiency stagnates, oil will truly become an appreciably limited resource, confirming the arguments of peak oilers. Some claim discovery will not aid the present oil crisis, and they reason that any plausible amount of successful exploration could not possibly resurrect the chances of the oil market. Dr. Fatih Birol, chief economist at the International Energy Agency in Paris, references data in an attempt to confirm the dire nature of this predicament: "The first detailed

assessment of more than 800 oil fields in the world, covering three-quarters of global reserves, has found that most of the biggest fields have already peaked and that the rate of decline in oil production is now running at nearly twice the pace as calculated just two years ago [referring to 2007]" (Connor). The fact that oil-producing countries are minimally investing in oil discovery and production also maligns the hope of current oil economy, Dr. Birol states (Connor). Roy L. Nersesian, energy industry professional and adjunct professor at Columbia University, notes three trends verifying the decline of oil discovery worldwide: "The frequency of discovering major oil fields is dropping; the size of newly discovered oil fields is falling; and consumption is getting ahead of additions to proven reserves" (206). These combined factors, according to adherents of this position, prove that scant oil remains and that scant hope remains for the industry.

However, a well-rounded assessment of the potential for oil discovery does not confirm this conclusion in the least. Jason Schwarz, finance writer and chief options strategist for Lone Peak Asset Management, points to recent discoveries of oil in Brazil, the United States, the Gulf of Mexico, Iraq, Iran, West Africa, and the North Sea to demonstrate that oil is not becoming scarcer (125-127). Also, technological advancements have made certain non-conventional oil sources available and profitable. Not only that, this technology principally applies to recent discoveries in areas in the U.S. and countries friendly to the U.S. Three specific finds stand out: the Bakken shale formation, the Shfela shale formation, and the Alberta sands.

The Bakken oil shale is located mainly in North Dakota, but this 25,000 square mile formation also sprawls into Montana, Saskatchewan, and Manitoba ("Dean Capital Buys Acreage in Bakken Shale"). This find is one of the most promising American oil discoveries in a considerable time, and it promises between 5 and 10 billion barrels of recoverable oil in North Dakota and Montana alone. Previously, such a shale deposit was not worthwhile or valuable, but because of the use of hydraulic fracturing and in-situ extraction processes to loose the oil from the

surrounding shale, oil shale is now a treasured resource (Walsh).

Another instance of a significant oil shale discovery is the Shfela formation, the size of which makes the Bakken seem miniscule. The Shfela oil shale formation is located in Israel, a country often hailed as the only Middle Eastern country with no oil. No longer does this claim bear near the truth though, for the Shfela boasts an impressive 250 billion barrels of shale oil (Udasin). A comparison to the largest oil producer in the world provides some perspective on the magnitude of this discovery. Saudi Arabia, the country which has always had the reputation of having and producing the most oil in the world, states 260 billion barrels as their proven reserves (Mills 109). Obviously, Shfela is huge, and the potential for oil discovery is immense.

In addition to the discoveries in oil shale, oil sands, specifically those of Alberta, Canada, are current evidence of the potential for oil discovery. Oil sands, though different in formation, require similar techniques as oil shale in order to be extracted and refined. Alberta's sands increased Canada's proven reserves from 5 billion to 180 billion, making it the second in the world (if Shfela and Israel are excluded), behind Saudi Arabia (Kasoff). Unconventional oil, from sources like oil sands and oil shale, demonstrates the vast supply of oil that remains to be used and the substantial impact that technology creates within the oil industry.

Oil is not on its way out. Though many say it is, and still others wish it were, it is not on the brink of extinction. New technologies and discoveries continue to add to the world's supply, constantly refuting the oversimplified, inaccurate theories predicting its decline. As time passes on, human ingenuity will continue to triumph, advancing the availability of oil, despite the doubts of human skepticism.

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